

Gov. Doc
Can
M



CANADA

Mines, Bureau of
Explosives Division

Annual

report of the

EXPLOSIVES DIVISION

calendar year

1961

DEPARTMENT OF MINES AND TECHNICAL SURVEYS



CANADA

report of the
**EXPLOSIVES
DIVISION**

calendar year **1961**

H. P. KIMBELL
Chief Inspector



report of the

REPTILES

SECTION

1991


calendar year

ROGER DUHAMEL, F.R.S.C.
QUEEN'S PRINTER AND CONTROLLER OF STATIONERY
OTTAWA, 1962

Cat. No. M81-1961

CONTENTS

Offices and Staff	5
Ammonium Nitrate blended with Fuel Oil..	5
Manufacture	6
Authorization and Testing	7
Licences, Permits and Certificates	7
Imports	8
Inspections	8
Thefts	8
Abandoned Explosives	9
Destruction of Explosives	10
Prosecutions	10
Accidents	11
—in Use	11
—in Manufacture	12
—in Storage	12
—in Transportation	12
—in Misuse	13
Convention Addresses	14
 APPENDICES	
A. Factories licensed to manufacture explosives	18
B. Explosives imported into Canada	19
C. Accidents: Part I—all types	20
Part II—misuse	21
D. Authorized explosives and manufacturers..	25



Digitized by the Internet Archive
in 2025 with funding from
University of Toronto

<https://archive.org/details/31761120019534>

THE EXPLOSIVES DIVISION

exists solely in the interests of public safety. Its function is to administer the Explosives Act which, by a system of licences and permits supported by inspection, controls the manufacture, authorization, sale, storage, and importation of explosives, as well as the transportation of explosives by road.

offices and staff

The main office of the Division is in the Mines Branch Building, 555 Booth St., Ottawa 1. Branch offices are at 739 West Hastings St., Vancouver, and at 7 Terminal Road, Halifax.

The Division's staff—six inspectors and ten clerical employees—was temporarily decreased by the June retirement of W. B. Paton, who had been in charge of the Vancouver office for 17 years. His post has been filled by R. P. Quinn who was transferred from Ottawa. A new inspector, B. P. McHugh, joined the Division on January 3, 1962. Mr. McHugh comes to us with 19 years experience in the explosives industry.

ammonium nitrate blended with fuel oil (AN/FO)

The AN/FO development, initiated in 1956, began to take on the proportions of a revolution in the explosives industry. At first considered useful only for large drillholes in open-pit work, AN/FO has now been proven practicable in small-diameter holes and, with the resolution of other problems too, its use has spread to mining operations underground. After much experimentation with on-site blending by 'in-the-bag' injection methods, larger operators are becoming convinced—as indeed was a large quarry operator in 1959—that machine blending is necessary for all-round efficiency. Two factory licences are now in force for AN/FO explosives exclusively, and there are signs that there will be others.

The underground development of AN/FO necessitated much collaboration between the Division and provincial departments of mines. Senior officers of

EXPLOSIVES DIVISION

the Division and the Ontario Department of Mines visited Sudbury and Elliot Lake for inspections and discussions with officials of mining companies. In September the Chief Inspector attended the Annual Conference of Provincial Mines Ministers where AN/FO was the chief topic of discussion of the Mining Operations Committee.

The relative insensitivity of AN/FO tends to create a lack of respect for this explosive. Justification for concern was strikingly demonstrated on December 27 by a serious explosion in Virginia, U.S.A. Workers actually used an oxyacetylene torch and electric-arc welding equipment within a building used to manufacture AN/FO and containing about 30 tons of the explosive plus about 20 tons of untreated ammonium nitrate. The resulting fire developed to detonation and left a crater 100 feet in diameter. Diligent clearing of the area by fire fighters prevented serious casualties but nearby dwellings were totally destroyed.

AN/FO is an "explosive" within the definition of the Act, regardless of other designations applied to it by the trade or by any other agency. AN/FO has definite advantages that must not be compromised by carelessness in handling and use.

manufacture

In Appendix A, the names of three small fireworks factories have been dropped from last year's list of eighteen and four others have been added. Two of the additions represent reinstated licences: Cyanamid of Canada Limited renewed production of nitroguanidine for military propellants; and the Seven Islands, Quebec, factory of Canadian Industries Limited came back into production of slurry explosives. Two new factories were licensed: Gevelot of Canada Limited commenced operations in April, and Delta Explosives Limited near the end of the year; the former manufactures shotgun ammunition and the latter blasting explosives based on ammonium nitrate.

Production of blasting explosives in licensed factories totalled approximately 147 million pounds, a reduction of about 9 per cent from the 1960 total of 161 million pounds. Considerable quantities of ammonium nitrate were blended with fuel oil at the site of work under the *Ammonium Nitrate and Fuel Oil Order*.

authorization and testing

During the year, 219 samples were examined by the laboratory as follows:

Blasting Explosives	
(a) for authorization.....	28
(b) run-of-work.....	16
Small-arms Ammunition.....	31
Fireworks.....	97
Blasting Accessories.....	14
For other Government Departments.....	33

Nothing radically new is represented in the samples of explosives "for authorization"; they were modifications of nitroglycerin, slurry, and AN/FO types.

The samples "for other Government Departments" denote assistance in assessing hazards in handling and transporting explosives and other dangerous goods. Chiefly involved are the Department of National Defence, the National Harbours Board, the Post Office Department, and police authorities.

Forty-seven shipments of Chinese firecrackers were sampled and tested by the RCMP at the Port of Vancouver.

A complete list of explosives authorized for manufacture and importation is given as Appendix D.

licences, permits and certificates

The following were issued during 1961; 1960 figures are in parentheses:

Factory Licences.....	19	(18)
Magazine Licences (storage for sale).....	448	(454)
Temporary Magazine Licences (storage for private use).....	990	(1,035)
Registered Premises Certificates (storage of small quantities for sale).....	100	(104)
Transportation Permits (by road).....	275	(296)
General Importation Permits (one shipment only).....	1,372	(1,374)
Annual Importation Permits.....	45	(59)

EXPLOSIVES DIVISION

The reduced number of temporary magazine licences is partly due to the fact that licences on mining properties in Newfoundland were allowed to lapse by agreement with the Department of Mines following passage of comprehensive explosives regulations under that province's *Regulations of Mines Act*. This is in accordance with Section 2(h) (i) of the *Explosives Act* which eliminates from its jurisdiction magazines controlled by adequate provincial mining legislation.

imports

Explosives imported during the year, under the terms of importation permits referred to above, are detailed in Appendix B. The large quantity described as "for other manufacturing purposes" is mainly nitrocellulose used in the manufacture of lacquers, coated fabrics, etc. The phrase "for use in explosives factories" describes explosives used as components of other commercial explosive products and for which there are no Canadian manufacturing facilities.

inspections

Inspection statistics reflect the staff deficiency in 1961. Inspections carried out during the year, including those by Deputy Inspectors of Explosives of the RCMP, are given below; 1960 figures are in parentheses:

Factories.....	47	(45)
Magazines.....	1,947	(2,572)
Registered Premises.....	88	(156)
Transportation.....	80	(149)
Storage in Unlicensed Premises.....	193	(145)

thefts

Reports of forty thefts of explosives were received during the year, involving 1,160 pounds of blasting explosives, 7,229 detonators, and small quantities of other types.

Thirty of the thefts followed forcible entry of magazines licensed under the Act, and four more were from magazines under the jurisdiction of provincial mining authorities. In two instances explosives were stolen from vehicles which had been parked unattended in violation of regulations.

Theft is of course a criminal offence *per se* but when explosives are involved there is always concern that the hazardous 'loot' may cause trouble. Generally two types of person are suspected—the professional safe-breaker and the curious or mischievous youth. It is felt, though so far not conclusively proven, that known criminals were responsible for nine break-ins in the Edmonton area during 1961. On the other hand, juveniles and young people perpetrated nine of the total 1961 thefts and three youths were injured by detonators during subsequent experiments.

abandoned explosives

Having read of a fatal accident caused by illegally stored explosives, a British Columbia firm of chartered accountants reported to the RCMP their suspicion, gained through professional channels, of a cache of dynamite. The police found and arranged destruction of 400 pounds of stumping powder which had been left lying in the open by a logging firm. The firm had become defunct and the former president and directors were thought to be in the United States.

Three 50-pound boxes of dynamite, in dangerous condition from deterioration, were found in a ditch just outside a residential area of a Quebec mining town. Police arranged destruction of the explosives by a competent person who estimated they had been there for 4 or 5 years. Those responsible were not discovered.

Following a fishing trip, an Ontario boy reported finding 56 detonators near the site of a beaver dam which had been destroyed by blasting. The owner was not discovered but the detonators were of a size not in common use in local mines.

In British Columbia, a hunter reported the presence of 1,250 pounds of dynamite in an abandoned mine tunnel which he had entered without restraint. Investigation disclosed that the mine had been in disuse since 1955. The Chief Inspector of Mines is dealing with this case under the *Metaliferous Mines Regulations Act*.

A resident of Yukon Territory reported to the RCMP that he had discovered a box containing 71 detonators on a rafter in his home; apparently it had been cached away by an unknown former occupant many years ago.

Finding detonators in the possession of children, police later learned that a sewer contractor had abandoned 490 pounds of dynamite and 1,200 detonators—apparently just forgotten. The owner was prosecuted and fined under the Act.

EXPLOSIVES DIVISION

These are examples of 46 such reports received by the Division in 1961, involving totals of 4,791 pounds of dynamite and 6,943 detonators. The potential hazard is obvious. In most instances it is not possible to trace those responsible for this appalling carelessness or thoughtlessness.

destruction of explosives

Inspectors are of course responsible for advising licensees and others on the condition of explosives in storage. In 1961 it was necessary to recommend destruction of 11,700 pounds of dynamite and 1,870 detonators which had become unfit for use because of deterioration through age or poor conditions of storage.

In one case, the manufacturer's representative destroyed 23,350 pounds of dynamite which had become affected by water during transportation by boat in the Strait of Georgia. The vessel had sprung a leak during a January storm.

One report is worthy of mention as an example of a method of disposal which should *not* be employed. A Toronto firm, having purchased the assets of a defunct Quebec mine, including 3,000 pounds of dynamite, disposed of the explosive by drowning it in a bay of the St. Lawrence River about 1,000 feet from shore. Such a method of disposal always leaves a lurking possibility, however remote, that the nitroglycerin may cause future trouble—for example during dredging operations. There are only two sure and safe methods of destroying nitroglycerin explosives—burning and detonation.

prosecutions

Prosecutions under the Act were fewer than in any year since 1953, court action being taken in only twelve instances. Ten cases involved insecure or otherwise improper storage; one was for failure to display "EXPLOSIVES" warning signs during transportation; and the other was for offences in both storage and transportation. In the last case, which may serve as an example, a fine of \$150 and costs was imposed on conviction under six charges: (a) storage was in a "detached store" of too flimsy construction; (b) the detached store was not marked "EXPLOSIVES"; (c) the quantity exceeded that which may be stored without a magazine licence; (d) the vehicle used had no tailgate and the packages of explosives were not covered; (e) the packages of explosives were not protected against the steel floor of the vehicle; and (f) no fire extinguisher was carried in the vehicle.

In another case, provincial police invoked punishment under the Criminal Code for insecure storage of explosives. A boy had stolen detonators from an old shed and taken them to school to 'trade' for comic books. His escapade was revealed when one of his school mates sustained serious injury to his left hand, and the owner of the explosives was subsequently prosecuted and fined. The owner stated that the explosives had been in the shed since 1954 and he had forgotten about them.

There were also two successful prosecutions for violations of a municipal bylaw governing safe storage of explosives. Fines imposed were \$75 and \$100.

accidents

Appendix C, Part I, is an analysis of all reported accidents that caused death or injury. The total from all causes is 85, a pleasing reduction from the average of 113 for the previous 5 years.

—in use

(1961) 44 accidents, 7 killed, 45 injured

(1960) 71 accidents, 10 killed, 81 injured

It is in this category that the main reduction in accidents occurred, with mines and quarries—controlled by provincial mining legislation—showing very noticeable improvement. Explosives accidents in mines and quarries totalled 29, with 3 killed and 30 injured; the 5-year average is 50 accidents, with 5 deaths and 61 injured.

The expanding use of AN/FO explosives should reduce accidents caused by "drilling into explosives" and "striking unexploded charge in removing debris" but this effect has not yet appeared to any large degree. Total accidents under these two classifications comprised 14, compared with the 5-year average of 18.

Because labour is a matter for provincial jurisdiction, the Act does not control the using of explosives. New Brunswick is the latest province to move towards legislation in this field. The Trades Examination Branch of the Department of Labour, in preparation for a system to ensure competence in the powderman's trade, sponsored a series of training classes early in 1961. These were well attended and our Halifax Inspector, G. J. Boisjoli, was able to render assistance as a lecturer.

EXPLOSIVES DIVISION

—in manufacture

(1961) 4 accidents, 5 injured

(1960) 3 accidents, 3 injured

The terms of a factory licence require that every ignition of explosive, however minor, shall be reported. In some types of factory, for example those manufacturing detonators and ammunition primers, small detonations are expected and precautions are taken. In 1961 there were four such incidents, involving very minor injuries.

—in storage

(1961) 1 accident, 1 injured

(1960) 1 accident, 4 killed

The single 1961 accident involved most unorthodox 'storage', if indeed it can be classed as storage at all. A British Columbia farmer sustained serious head injuries while hunting a rat in his barn with a rifle. Shot from the loft, a bullet caused a violent explosion which blew out the entire wall of the building. Some unexploded sticks of deteriorated dynamite were found in the debris and police investigation disclosed that a former tenant had, in 1958, hidden explosives within the wall. Although unproven, it appears that the explosives had been stolen.

A magazine in Newfoundland was destroyed in a forest fire during July. Its contents, 1,000 pounds of dynamite, were burned but fortunately did not explode. Magazines in forested areas should be of fire-resistant construction and sited in clearings of the largest possible extent. At least 25 feet should be cleared in all directions.

—in transportation

(1961) no casualties

(1960) 1 accident, 1 killed

Although there were no casualties, two accidents in 1961 are noteworthy. Travelling near Laprairie, Quebec, a truck loaded with 10,000 pounds of dynamite swerved off the highway and collided with a tree. The driver admitted that he fell asleep momentarily and lost control. The vehicle was

demolished and many packages of explosives were smashed and scattered on and near the highway, but there was no ignition nor explosion. Fortunately this happened near the Beloeil explosives factory and expert assistance in clearing and decontaminating the area was quickly given by Canadian Industries Limited. The truck had come to rest only about 300 feet from a motel.

The other accident happened in August on a Quebec provincial railway, and is notable as an illustration of the frequent comment: "It is more difficult to protect people from themselves than from explosives." A boxcar had not only been loaded with 2,250 pounds of dynamite *and* 400 detonators *and* 35 barrels of gasoline, but the barrels had actually been filled with gasoline within the car. During unloading, vapor from spilled gasoline was ignited from a brakeman's lantern and the resulting fire eventually caused detonation of the dynamite. Fortunately most of the explosive burned, thus limiting the violence of the detonation. No one was injured and damage was confined to the boxcar and the rail spur.

—in misuse

(1961) 34 accidents, 3 killed, 44 injured

(1960) 33 accidents, 1 killed, 64 injured

A brief description of the circumstances of all misuse accidents is given in Appendix C, Part II.

It was a bad year for detonator accidents. Of the 34 misuse accidents, 21 were caused by playing or tampering with detonators which had either been stolen or, more frequently, left lying about illegally by careless or thoughtless persons. The thirty victims of exploded detonators were children and many of them were permanently maimed. In the continuing campaign against this type of accident the Division has now distributed 58,000 copies of the pamphlet *Explosives—A Continuing Danger* and 4,000 copies of the warning poster *You Wouldn't Hurt a Child!*

The list of eight fireworks accidents is significant in that all of them were caused by noisemakers, i.e. firecrackers, and there was no record of any accidents caused by such visual-effect devices as lawn lights, roman candles, fountains, etc. Nearly all firecrackers are imported from China and none are produced in Canada.

EXPLOSIVES DIVISION

Following a submission by T. W. Hand Fireworks Company Limited and a resolution passed at the Annual Convention of the Canadian Association of Fire Chiefs, the Minister of Mines and Technical Surveys revised his declaration concerning the size of Chinese firecrackers authorized for importation. The new standard reads: "Chinese firecrackers with gunpowder composition and not exceeding 2 inches in length and $\frac{1}{4}$ inch in diameter, and small Chinese fireworks, are authorized when found to function satisfactorily on examination at port of entry." Formerly the maximum size was 4 inches in length and $\frac{9}{16}$ inch in diameter. Due to carryovers the effect of this change will not be complete until after the 1962 season.

There was a tragic toll of three deaths and four serious injuries involved in the four accidents with home-made bombs. Before 1962 was 36 hours old there was still another fatality and in this case the verdict of the coroner's inquest was noteworthy:

"PAUL DEJOURDAN, age 14 years, came to his death by injuries received in an explosion of a home-made bomb. The explosion was purely accidental and we attach no blame to any person other than the deceased. We recommend that a definite programme of education to inform children and adults of the dangers of mixing certain elements which may produce fatal results be emphasized. The interest in Science to-day being at such a high level, we feel this is paramount, and will help to prevent a recurrence of such accidents."

The Division recognizes its responsibility in this matter of education and has regularly published warning literature, particularly since young people became obsessed with amateur rocketry. It is encouraging to note that none of this year's reported accidents resulted from home-made rockets. The Division is giving the above inquest jury's report some publicity among educational authorities and safety organizations.

convention addresses

In May the Chief Inspector took part in a panel discussion on the subject "Transportation of Explosives" at the Annual Conference of the Canadian Highway Safety Council in Montreal. This was part of the program of the Laws and Enforcement Committee of the Council and it provided the opportunity to emphasize the need for co-operative enforcement of *Explosives Act* regulations by provincial and local authorities.

CALENDAR YEAR 1961

A similar opportunity was presented in July at Ingonish, Nova Scotia. There, G. J. Boisjoli, Resident Inspector at Halifax, served as a panelist at the Annual Convention of the Canadian Association of Fire Marshals. The subject was "Transportation of Dangerous Commodities".

In August at Kitchener, Ontario, the Chief Inspector delivered an address on "The Explosives Act" to the members of the Canadian Association of Fire Chiefs. This was well received and the meeting voiced a firm opinion on the hazards of firecrackers. Subsequent action by the Resolutions Committee resulted in a decision to amend the definition of authorized Chinese firecrackers, as referred to elsewhere in this report.

APPENDICES

EXPLOSIVES DIVISION

appendix A

Factories Licensed to Manufacture Explosives, 1961

Owner	Location of Factory	General Nature of Product
W. F. Bishop & Sons Limited.....	Unionville, Ont.....	Fireworks
Canadian Arsenals Limited.....	St. Paul l'Ermite, Que.....	Filling military shells and fuzes
Canadian Arsenals Limited.....	Valcartier, Que.....	Filling military small-arms ammunition
Canadian Arsenals Limited.....	Valleyfield, Que.....	Military explosives, propellants
Canadian Industries Limited.....	Beloeil, Que.....	Blasting explosives, fuse powders, nitro- compounds
Canadian Industries Limited.....	Brainerd, Man.....	Blasting explosives
Canadian Industries Limited.....	Brownsburg, Que...	Ammunition, detonators, blasting ac- cessories, pyrotechnic signals
Canadian Industries Limited.....	Calgary, Alta.....	Blasting explosives
Canadian Industries Limited.....	James Island, B.C. .	Blasting explosives
Canadian Industries Limited.....	Nobel, Ont.....	Blasting explosives
Canadian Industries Limited.....	Seven Islands, Que...	Blasting explosives
Canadian Safety Fuse Company Limited	Brownsburg, Que...	Safety fuse, detonating fuse, blasting accessories
Cyanamid of Canada Limited.....	Niagara Falls, Ont...	Nitroguanidine
Delta Explosives Limited.....	St. Joseph du Lac, Que.....	Blasting explosives
DuPont of Canada Limited.....	North Bay, Ont.....	Blasting explosives
Gevelot of Canada Limited.....	Saskatoon, Sask....	Ammunition
T. W. Hand Fireworks Co. Limited....	Cooksville, Ont.....	Fireworks and military pyrotechnics
T. W. Hand Fireworks Co. Limited....	Papineauville, Que...	Fireworks and military pyrotechnics
Iron Ore Company of Canada.....	Schefferville, Que...	Blasting explosives

appendix B

Explosives Imported into Canada, 1961

Class	Division	Description	Quantity
I		Gunpowder.....	14,400 lb.
II		Nitrate mixtures.....	1,000 lb.
III		Nitro-compounds—	
	1 and 2	Blasting explosives.....	89,985 lb.
	2	Propellants.....	32,292 lb.
	2	For use in explosives factories.....	4,678,586 lb.
	2	For other manufacturing purposes.....	4,364,658 lb.
VI	1	Primers.....	3,435,174 units
	1	Safety fuse.....	45,000 feet
	1	Safety cartridges.....	21,209,287 rounds
	2	Detonating fuse.....	287,545 feet
	2	Seismic explosives.....	21,652 lb.
	2	Blasting explosives.....	204,626 lb.
	3	Detonators.....	183,990 units
VII	2	Manufactured fireworks.....	1,627,453 lb.
		Miscellaneous.....	26,631 lb.

EXPLOSIVES DIVISION

appendix C

Part I—Accidents Involving Explosives, 1961

Circumstances or Cause	Mines and Quarries			Elsewhere			Total		
	Acci- dents	Killed	In- jured	Acci- dents	Killed	In- jured	Acci- dents	Killed	In- jured
In Use									
a Delaying too long in lighting fuse.....	6	3	6	1	1	1	7	4	7
b Premature firing of electrical blasts.....									
c Not taking proper cover.....	2		2	2		2	4		4
d Projected debris.....	1		1	6		6	7		7
e Returning too soon after blasting.....	3		3				3		3
f Improper handling of misfires.....									
g Rough Tamping.....									
h Ignition of explosives by flames, sparks, etc.....									
i Drilling into explosives.....	6		6	1		1	7		7
j Striking unexploded charge in removing debris.....	5		6	2		5	7		11
k Preparing charges.....	1		1	1	1		2	1	1
l Using too short a fuse.....				1	1		1	1	
m Insufficient ventilation after blasting...	2		2				2		2
n Springing shots.....									
o Inadequate guarding.....	1		1				1		1
p Various.....	2		2	1	1		3	1	2
Total.....	29	3	30	15	4	15	44*	7	45
In Manufacturing							4		5
In Storage							1		1
In Transportation (by road)									
Total.....							5		6
In Misuse									
(a) Detonators.....							21		30
(b) Other explosives.....							1		2
(c) Fireworks.....							8		8
(d) Home-made explosives.....							4	3	4
Total.....							34†	3	44
Miscellaneous							2†	2	1
Total All Circumstances.....	29	3	30	15	4	15	85	12	96

*These accidents occurred in circumstances not directly controlled by the Act.

†Brief descriptions of these accidents are given on the following pages.

appendix C

Part II—Misuse of Explosives

Ref. No.	Cause of Accident	Killed	Injured
(a) Detonators			
4-4	Two boys, aged 11 and 13, suffered severe hand burns and minor facial injuries when they threw a detonator into a small fire. Detonators had been found at the edge of a cliff near the seashore.....		2
2-4	A 10-year-old boy lost three fingers when he heated and exploded a detonator with a match. Detonators had been stolen by a group of boys from a quarry storage shed.....		1
3-4	A 14-year-old boy suffered severe cuts to legs, abdomen and hands when he exploded an electric detonator by inserting the lead wires in a wall receptacle. Dynamite and detonators were stolen from a quarry magazine....		1
1-5	A 12-year-old boy severely injured his left hand when he applied a match to a detonator—one of a number stolen from an unlocked farm shed and distributed in a school. The stolen caps and dynamite were more than 7 years old. The owner, who had forgotten about them, was prosecuted under the Criminal Code.....		1
1-6	Four very young boys were severely injured by the explosion of a detonator. A 9-year-old suffered a punctured eye and other superficial injuries; two others, aged 6 and 7, suffered burn and blast injuries to face and upper body; and a 7-year-old lost part of thumb and two fingers of his right hand. Detonators had been abandoned in an old basement and were found there by the children. The explosion occurred when one boy began grinding a detonator on an emery wheel. The owner was prosecuted under the Explosives Act.....		4
1-7	An 18-year-old boy suffered severe injuries to his right hand when he caused explosion of a detonator by tapping it on a concrete sidewalk. The detonator had been found in the back yard of his home. A companion sustained minor injuries.....		2
2-6	A 17-year-old boy lost the tips of two fingers and his 18-year-old brother suffered an eye injury when a detonator they were attempting to dismantle exploded. It had been found partially buried in a back yard and had evidently been there for some years. The boys thought it was a radio resistor.....		2
3-8	Three juveniles sustained minor injuries when a detonator they struck with a hammer exploded. They found the detonator in their front yard and its origin could not be determined.....		3

EXPLOSIVES DIVISION

appendix C

Part II—Misuse of Explosives—*continued*

Ref. No.	Cause of Accident	Killed	Injured
	(a) Detonators—<i>continued</i>		
3-10	A 2-year-old boy was injured by the explosion of a detonator which had been inadvertently thrown into a fireplace. Detonators had been found on a construction site by a group of children who, not knowing what they were, had cut off the coloured wire and stored them in various places in their homes.....		1
4-8	A 9-year-old boy injured his left hand when a detonator exploded as he heated it with a match. The detonators were found in a root cellar, apparently overlooked for 4 years. The owner had previously operated a licensed magazine for 30 years.....		1
3-9	A 10-year-old boy lost his thumb and two fingers when a detonator exploded while he was heating it with a match. Detonators were found in a sack with some dynamite in a barn.....		1
6-10	A 13-year-old boy lost the thumb and index finger of his right hand while setting off detonators as firecrackers. The detonators were found in an attic where they had been hidden and forgotten.....		1
1-11	A 13-year-old boy suffered minor injuries when he set off an electric detonator by inserting the lead wires in a wall receptacle. Detonators had been found in a field along with twenty sticks of dynamite.....		1
5-10	An 11-year-old boy was severely injured about the face and eyes when some detonators he threw into a fireplace exploded. The detonators had been abandoned in the back shed by a previous tenant.....		1
2-9	Two 13-year-old boys sustained very severe injuries when they opened a box of detonators and the contents fell to the floor and exploded. One had his right hand blown off and lost the sight of one eye. The other lost the sight of one eye and the first two fingers of his left hand. Unknown to the owner, detonators had apparently been in the attic of his barn for a number of years.....		2
4-10	A 12-year-old boy lost the thumb and two fingers of his left hand when he exploded a detonator by inserting a piece of burning string in the open end. Detonators had been found by a school mate on a beam in his basement where they had been abandoned by some previous tenant, and brought to school as firecrackers.....		1
1-4	A 7-year-old girl suffered severe facial injuries and lost partial sight of one eye when a detonator exploded in her face after she struck it with a hammer. Her 14-year-old brother brought the detonator home after a group of boys had broken into a licensed magazine.....		1

appendix C

Part II—Misuse of Explosives—*continued*

Ref. No.	Cause of Accident	Killed	Injured
	(a) Detonators—<i>concluded</i>		
1-9	A 15-year-old boy sustained injuries necessitating the amputation of the thumb and two fingers of his left hand. The accident occurred while he was setting off some detonators as firecrackers. The safety fuse fell out of one; he picked it up to re-insert the still-burning fuse and the detonator exploded. Detonators and safety fuse had been stolen from a detonator magazine in a store room where he worked. Admittance was gained after he had learned the hiding place of the magazine key.....		1
1-12	An 8-year-old boy was slightly injured when he exploded a detonator by striking it with a rock. Although two men loading holes with explosives were only 10 or 12 feet away, they said he acquired the detonator without their knowledge.....		1
8-10	A 12-year-old boy broke into a mine magazine and obtained safety fuse, igniter cord and a detonator. He apparently assembled these explosives, ignited the cord by hammering it with a rock, and the detonator exploded. He lost part of the thumb and the first two fingers of his right hand.....		1
1-8	A 10-year-old may lose the sight of both eyes as a result of an exploding detonator. Apparently detonators were in an unguarded open box within easy access of children. The father of the injured boy has instituted a \$235,000 damage action against three defendants.....		1
	(b) Other Explosives		
3-6	Two children suffered burns when they detonated a railway track signal by dropping a rock on it. They had found the signal near the railway track.		2
	(c) Fireworks		
2-3	A 14-year-old boy suffered a badly cut wrist from a piece of glass propelled by a 4-inch firecracker. His brother had lit the firecracker, inserted it in a saltshaker and thrown it on the veranda.....		1
3-3	A 5-year-old boy suffered facial injuries when hit by a firecracker thrown by a group of boys.....		1
2-5	A young boy suffered burns to his leg when several firecrackers exploded in his pocket.....		1
3-5	A woman suffered a burned leg when a young girl threw a firecracker at her.		1
4-5	A 12-year-old boy suffered severe burns when a string of firecrackers set his clothes on fire.....		1

EXPLOSIVES DIVISION

appendix C

Part II—Misuse of Explosives—concluded

Ref. No.	Cause of Accident	Killed	Injured
(c) Fireworks—concluded			
5-5	A 10-year-old girl lost an eye when a firecracker which she threw into a fireplace exploded.....		1
6-5	A 4-year-old boy lost an eye when struck by a fragment of a plastic handle-bar grip. He had been watching a boy place a firecracker in the grip and light the fuse.....		1
7-5	A 12-year-old boy suffered facial burns when a firecracker exploded in his face.....		1
(d) Home-made Explosives			
1-2	A 21-year-old bank teller was killed when the home-made bomb he had prepared exploded prematurely. The ignition device consisted of two 6-volt batteries connected to a home-made electric clock timer. One bomb had been detonated successfully but the circuit was apparently still closed when the victim connected up a second bomb, and this one caused fatal injury. His 21-year-old companion sustained minor injuries.....	1	1
2-10	A 17-year-old boy lost his left hand when a bomb he was making exploded. He had tamped gunpowder into a lead pipe and was hammering it with a rock when the accident occurred. He had ignored a warning from his father about the consequences of tampering with chemicals and explosives.....		1
7-10	Two brothers, aged 11 and 16, were killed and their 16-year-old companion seriously injured by the explosion of a bomb prepared by packing an explosive mixture into a length of 2-inch pipe. The explosion occurred while they were plugging the ends.....	2	1
5-6	A 16-year-old youth was seriously injured by flying glass when preparing the explosive for a home-made bomb. He was mixing the ingredients in a bottle when an explosion occurred.....		1
Miscellaneous			
2-8	A man was killed by the explosion of a bomb concealed in a parcel which had been placed on the seat of his jeep. His nephew, standing nearby, sustained burns.....	1	1
4-9	An aged man died instantly from injuries which were apparently self inflicted by means of explosives.....	1	

appendix D

Authorized Explosives

Manufactured in Canada

Canadian Industries Limited (Ammunition Division) Montreal, Que.

Detonators, Electric Detonators and Squibs
 Delay Switch
 Dextrinated Lead Azide
 Heater Cartridge
 Highway Flares
 Igniter Cord Electric Starter
 Lead Salt
 Lead Styphnate (Normal)
 Marine Flares
 MS Detonating Relay
 Percussion Caps
 Railway Fuses
 Railway Track Signals
 Safety Cartridges
 Styphnic Acid
 "Sureshot" and "Seismic Marine" Boosters
 Tetrazene

Canadian Industries Limited (Explosives Division) Montreal, Que.

Amex and Amex II
 Amite
 Ammonia Dynamite—20, 25, 30, 35, 40, 50 and 60 per cent
 Ammonia Dynamite, Agricultural—60 per cent (for export only)
 Ammonia Dynamite Extra—40, 50, 60 and 70 per cent (for export only)
 Ammonia Dynamite, Free Running—40 and 65 per cent
 Ammonia Dynamite, High Density—20, 25, 30, 35, 40, 50 and 60 per cent (for export only)
 Ammonia Dynamite, Low Density—20, 25, 30, 35, 40, 50, 55 and 60 per cent (for export only)
 Ammonia Dynamite, Quarrying—60 per cent
 Ammonia Dynamite, Seismograph—60 per cent (for export only)
 Ammonia Dynamite, Stumping—20 per cent (for export only)
 Ammonia Gelatin—30, 35, 40, 50, 60, 75, 80 and 90 per cent (for export only)
 Black Blasting Powder
 Blastol—60 per cent
 BRX-7—75 per cent
 Cilgel-B and Cilgel-C—70 per cent
 C.I.L. Dynamite—Nos. 3 and 5
 C-X-L Dynamite No. 5
 C-X-L Gelatin—Nos. 1 and 2
 C-X-L-ite
 Detonating Fuse Primer
 Ditching Dynamite—50 per cent
 Dygel—75 per cent
 Dynamex—40, 50, 60 and 70 per cent
 Exel-G, Exel-S and Exel GW—75 per cent

EXPLOSIVES DIVISION

Authorized Explosives—*continued*

Manufactured in Canada—*continued*

Canadian Industries Limited (Explosives Division)—Concluded

Explosives BL-100, BL-112, BL-114, BL-115, BL-116, BL-125, BL-130, BL-132, BL-134, BL-135, BL-136, BL-138, BL-143, BL-144, BL-145, BL-147, BL-148, BL-149, BL-150, BL-151, BL-152, BL-153, BL-154, BL-155, BL-156 and BL-157
Forcite—30, 35, 40, 50, 60, 75, 80 and 90 per cent
Fuse Powders—35, 40, 44, 53 and 65 seconds
Gelatin Dough—90 per cent
Geogel—60 per cent
Giant Gelatin—30, 35, 40, 50, 60, 75, 80 and 90 per cent
Guhr Dynamite
Guncotton
Gunpowder
Hi-Velocity Gelatin—40, 60, 75 and 80 per cent
Hydromex
Liquid Nitroglycerine
Loshok—20 per cent
Monobel—Nos. 4, 6, 7, 10, 11, 14 and X(EQ.S.)
Nitrocotton
Nitrone—S-1, T-1, T-3, T-4 and S-M
Nitrone Primer and Nitrone S-1 Primer
Nitropel
Nitrox
Pentaerythritol Tetranitrate
Polar Stumping Powder—20 per cent
Primers—Pentolite, Pento-Mex I, II and III, and Pento-Mite A, B and C
Pyromex—60 per cent
Seismic Gelatin—60 per cent (for export only)
Semi-Gelatin Nos. 1, 2, 3, 4 and 5 (for export only)
S.N.G.
Stopeite—20, 25, 30, 35, 40, 50, 55 and 60 per cent
Straight Gelatin—25, 30, 35, 40, 50, 60, 75, 80 and 90 per cent (for export only)
Submagel—40, 50, 60, 75, 80 and 95 per cent
Trinitrotoluene
Vibrex—60 per cent
Xactex—75 per cent

Canadian Safety Fuse Company Limited, Brownsburg, Que.

Detonating Fuse—"B-Line", "Primacord"
Hot Wire Fuse Lighters
Igniter Cord—"Thermalite" Brand, Types A and B
Igniter Cord Connectors—"Thermalite" Brand
Safety Fuse

Cyanamid of Canada Limited, Niagara Falls, Ont.

Nitroguanidine

Delta Explosives Limited, St. Joseph du Lac, Que.

Deltite
Deltex

DuPont of Canada Limited, Montreal, Que.

DuPont Ditching Dynamite
DuPont Extra—Nos. 1, 2, 3, 4 and 5

Authorized Explosives—continued

Manufactured in Canada—concluded

DuPont of Canada Limited—Concluded

DuPont Gelatin—25, 40, 50, 60 and 75 per cent
 DuPont Stumping Dynamite
 Energex—40, 50 and 60 per cent
 Energex FR—25, 40 and 65 per cent
 Energite—40, 50 and 60 per cent
 Gelex-A—1, 2, 3, 4 and 5
 Gypsal—Nos. 1 and 2
 Hi-Cap—1, 2 and 3
 Hi-Velocity Gelatin—40, 60 and 75 per cent
 NBL-101, NBL-102, NBL-103, NBL-201, NBL-301, NBL-302, NBL-304, NBL-307,
 NBL-309, NBL-402 and NBL-403
 Nilite FR and 310
 Nitramite FR and 306
 Nitramon Primers
 Pelletol Nos. 1 and 2
 Pentolite Primer
 Semi-Gelatin No. 1
 Special Gelatin—30, 35, 40, 50, 60, 75, 80 and 90 per cent
 Submarine Hi-Velocity Gelatin—60 and 80 per cent
 Super "Tovex" Gel
 Tovex
 "Trimtex" 208

Gevelot of Canada Ltd., Saskatoon, Sask.

Safety Cartridges

Pursuant to Section 8 of the Act, ammonium nitrate blended with fuel oil is an authorized explosive.

Manufactured by Foreign Firms

Aktiebolaget Bofors, Nobelkrut, Bofors, Sweden

Smokeless Sporting Powder
 Detonating Fuse, (Bofors Type)

American Cyanamid Co., Latrobe, Pa., U.S.A.

Fulminate of Mercury
 Detonators

Atlas Diesel Co., Stockholm, Sweden

Engine Starting Cartridges

Atlas Powder Co., Wilmington, Del., U.S.A.

Atlas Gelatin—60 and 75 per cent
 Atlas RXL-198
 Detonators
 Giant Gelatin—40, 60 and 75 per cent
 Giant Gelatin, Hi-Velocity—60 per cent
 Shaped Charges
 Subgel A.

EXPLOSIVES DIVISION

Authorized Explosives—continued

Manufactured by Foreign Firms—continued

Austin Powder Co., Cleveland, Ohio, U.S.A.

Ammonia Dynamite—AL-4 and 60 per cent

Apcomite 20-A

Austinite—Nos. 15, 20 and 21

Black Pellet Powder

Detonating Fuse

Primers—Pentolite, ANP-16 Amatol and ANP-16 Sodium Amatol

Leon Beaux & Co., Societa Italiana Munizioni, Milan, Italy

Safety Cartridges

Baschieri and Pellagri, Bologna, Italy

Smokeless Powder

Messrs. Germano Benzomi, Bergamo, Italy

Safety Cartridges

Bermite Powder Co., Saugus, Calif., U.S.A.

Baker Power Charge

Firing Head Igniter

Bombrini Parodi-Delfino, Rome, Italy

Safety Cartridges

Cardox Corporation, Chicago, Ill., U.S.A.

Cardox

Cardox Heaters

Cartoucherie Française, Paris, France

Primers and Primed Cases

Safety Cartridges

Smokeless Powder

Cascade Cartridge Co., Lewiston, Idaho, U.S.A.

Primers

E. I. DuPont de Nemours & Company, Inc., Wilmington, Del., U.S.A.

Auxiliary Charges C. 63

Black Fuse Powder

Detonators and Electric Detonators

DuPont Bulk Powder

DuPont Ditching—50 per cent

DuPont Extra—A, C, E, F and G

DuPont Gelatin—25, 40, 50, 60 and 75 per cent

Elcord Delay Unit

Explosive Rivets

Fulminate of Mercury

Gelex—Nos. 1, 2 and 3

Hi-Velocity Gelatin—40, 60 and 75 per cent

Jet Tappers

NBL-308

Nilite 101 and 202

Authorized Explosives—continued

Manufactured by Foreign Firms—continued

E. I. DuPont de Nemours & Company, Inc.—concluded

Nitramon—A, 2 and S
 Nitramon Primer and Nitramon S Primer
 Nitramex—2 and 2H
 Nitramite
 Nitramite Primer
 Nitrocellulose
 Nitrostarch
 Oil Well Explosives S.O.W.E. No. 1 and EL-431-A
 P. 6 Seismograph Booster
 Pelletol Nos. 1 and 2
 Pentaerythritol Tetranitrate
 Plastic Primer
 "Primacord" Booster
 "Primacord" MS Connector
 Primer HDP-1, HDP-2 and HDP-3
 Red Cross Extra—40, 50 and 60 per cent
 Red Cross Extra (H.W.R.)—40, 50 and 60 per cent
 "Rock Breaker" Pellets
 Shaped Charges
 Sheet Explosive BL-506A
 Smokeless Powders
 Special Gelatin—30, 40, 50, 60, 75, 80 and 90 per cent
 Special Primer with Booster (4 × 7.5 lb.)
 Submarine Hi-Velocity Gelatin—60 and 80 per cent
 Tetryl
 Waterproof Booster C.66

Dynamit Nobel AG, Troisdorf, Germany

Delay Connector
 Detonators and Electric Detonators
 Detonating Fuse "Nobel Cord"
 Safety Cartridges
 Smokeless Powder

Ellefsens Tendskruefabrikk, Stokke, Norway

Time Fuses and Detonators for Whaling Guns

EM-GE Sportgerate K-G Gerstenberger & Co., Wurttemberg, Germany

Blank Cartridges

Ensign Bickford Company, Simsbury, Conn., U.S.A.

Detonating Fuse
 Ignitacord
 Igniter Cup
 Lead Spitter
 Low Energy Detonating Cord
 Pull-Wire Safety Fuse Lighter

Federal Cartridge Corporation, Minneapolis, Minn., U.S.A.

Safety Cartridges

EXPLOSIVES DIVISION

Authorized Explosives—continued

Manufactured by Foreign Firms—continued

Federal Laboratories, Pittsburgh, Pa., U.S.A.

Lachrymatory Cartridges
Powder Loads

Gevelot, S.A., 50 Rue Ampere, Paris, France

Safety Cartridges

Giullio Fiocchi, Lecco, Italy

Power Tool Cartridges, Q 4
Primers and Percussion Caps
Safety Cartridges

Go Oil Well Services Inc., Fort Worth, Texas, U.S.A.

Jet Perforators

Greenwood & Batley Ltd., Leeds, England

Safety Cartridges

Gustav Genschow & Co., A.G., Hamburg, Germany

Safety Cartridges

Haerens Ammunition Arsenals, Denmark

Safety Cartridges

Haerens Krudtvaerk Frederiksvaerk, Denmark

Safety Cartridges

Harvell-Kilgore Corporation, Bolivar, Tenn., U.S.A.

Flashlight Cartridges
Powder Loads

Hercules Powder Company, Wilmington, Del., U.S.A.

Detonators and Electric Detonators
Gelatin Oil Well Explosive
Explosive E.P. 172-1 and 2
Gelumite D
Gelatin Extra—40 and 60 per cent
High Pressure Gelatin—60 per cent
Nitrocellulose
Smokeless Powder
Titan Booster 20
Vibro Caps
Vibrogel B and 3
Vibronite B

Hirtenberger Patronen, A.G., Hirtenberg, Austria

Primers and Primed Cases
Safety Cartridges

Hull Cartridge Co., Hull, Yorkshire, England

Safety Cartridges

Authorized Explosives—continued

Manufactured by Foreign Firms—continued

Imperial Chemical Industries Limited, England

Black Sporting Powder—FG, FFG, FFFG, and NFFFG
Black Whaling Powder
Cerium Low Tension Fusehead
Detonating Relay
Detonators and Electric Detonators
Gunpowder—G-7, G-12, G-20, SFG-12 and SFG-20
Pentaerythritol Tetranitrate
Percussion Caps
Safety Cartridges
Saluting Powder
Smokeless Powders
Smokeless Whaling Charges
Tetryl

Intermountain Research & Engineering Co. Inc., Salt Lake City, Utah, U.S.A.
Procure 3C Booster

Jet Guns Company, Fort Worth, Texas, U.S.A.
Shaped Charges
Glass Gun Perforating Charges—G.G. 2, G.G. 4 and G.G. 7

K. & G. Oil Tool & Service Co. Inc., Houston, Texas, U.S.A.
Junk Shot

King Powder Co., Cincinnati, Ohio, U.S.A.
Black Pellet Powder

J. C. Kinley Co., Houston, Texas, U.S.A.
Shells—P No. 51, P No. 70 and P No. 100
Kinley Sand Line Cutter

Lake Erie Chemical Co., Cleveland, Ohio, U.S.A.
Lachrymatory Cartridges

Lane-Wells Co., Houston, Texas, U.S.A.
Gun Perforator Cartridges

Lapua Cartridge Factory, Lapua, Finland
Safety Cartridges

Mecca Cable and Service Inc., Houston, Texas, U.S.A.
Magniset Cartridges

Mid Continent Torpedo Co. Ltd., Tulsa, Okla., U.S.A.
Red Head Firing Heads

Nitroglycerin Aktiebolaget, Gyttorp, Sweden
Shotgun Tracer Cartridges

A. B. Norma Projektilfabrik, Amotfors, Sweden
Safety Cartridges

EXPLOSIVES DIVISION

Authorized Explosives—*continued*

Manufactured by Foreign Firms—*continued*

Olin Mathieson Chemical Corp., East Alton, Ill., U.S.A.

- Cyclonite
- Detonators and Electric Detonators
- Kiln Gun Shells
- Linemen's Flare Lights
- Normal Lead Styphnate
- Railway Fusees
- Railway Torpedoes
- Safety Cartridges, Western and Winchester
- Smokeless Powder
- "Tempotool" Cartridges

Omnipol Ltd., Prague, Czechoslovakia

- Safety Cartridges

Osterreichische Jagdpatronenfabrik, Vienna, Austria

- Safety Cartridges

Oy Sako, AB, Finland

- Safety Cartridges

T. Page-Wood Limited, Bristol, England

- Safety Cartridges

Patronenfabrik, A.G., Solothurn, Switzerland

- Safety Cartridges

Perforating Gun Atlas Corporation, Houston, Texas, U.S.A.

- Jet Perforating Charges

Petroleum Tool Research Inc., Fort Worth, Texas, U.S.A.

- Detonator Assembly
- Vibro-Shot Charge Assembly

Pawam-Pionki, Warsaw, Poland

- Safety Cartridges

Poudreries Nationales, France

- D-2 Propellant Powder

Poudreries Royale De Wetteren "Cooppal & Cie, S.A.", Brussels, Belgium

- Safety Cartridges

Povazska Strojarné (Kovo Ltd.) Bystrica, Czechoslovakia

- Safety Cartridges

Pringle Powder Company, Bradford, Pa., U.S.A.

- Liquid Nitroglycerine

Remington Arms Co. Inc., Bridgeport, Conn., U.S.A.

- Safety Cartridges—Remington, Peters and Springfield
- Stud Driver Cartridges

Rey Freres, Paris, France

- Detonators and Electric Detonators
- Detonating Fuse—Plastex and Duplex
- Safety Cartridges
- Safety Fuse TT, TR

Authorized Explosives—concluded

Manufactured by Foreign Firms—concluded

F. J. Roberts Squib Company, Punxsutawney, Pa., U.S.A.

Miners' Safety Squibs

Rohm-Gesellschaft, Sontheim/Brenz, Kreis Heidenheim, Germany

Blank Cartridges

Signal Cartridges

Schaffler & Co., Vienna, Austria

Electric Detonators

Karl Schermer and Co., Karlsruhe, West Germany

Animal Stunner Cartridges

Standard Railway Fusee Corporation, Boonton, N.J., U.S.A.

Railway Torpedoes

AB Svenska Metallwerken, Vasteras, Sweden

Safety Cartridges

Temple Cox Development Co. Ltd., Bromley, Kent, England

Animal Stunner Cartridges

Trojan Powder Company, Allentown, Pa., U.S.A.

Nitrostarch

Trojan 40 per cent S, 50 per cent S, ESX, ESX-LD, PT-3X and TL-501-B

Weatherby's Sporting Goods Co., South Gate, Calif., U.S.A.

Safety Cartridges

Authorized Fireworks

Canadian Manufacturers

W. F. Bishop & Son Limited, Toronto, Ont.

Canadian Industries Limited, Montreal, Que.

Canadian Safety Fuse Company Limited, Brownsburg, Que.

Dominion Fireworks Co. Ltd., Dixie, Ont.

T. W. Hand Fireworks Co. Ltd., Cooksville, Ont., and Papineauville, Que.

Foreign Manufacturers (Certain Fireworks Authorized*)

Acme Sparkler and Specialty, River Grove, Ill., U.S.A.

American Railway Signal Company, Fostoria, Ohio, U.S.A.

Anthes Division Gleason Corp., Fort Madison, Ohio, U.S.A.

Astra Fireworks Ltd., London, England

M. Backes' Sons Inc., Wallingford, Conn., U.S.A.

E. Benjaminson, Falu Pyrotekniska, Industri, Falun, Sweden

J. G. W. Berckholtz, Hamburg-Bahrenfeld, Germany

Hermann Bischoff, Bremen, Germany

C. T. Brock & Co., Hemel Hempstead, Herts., England

*A list of authorized fireworks is on file in the office of the Explosives Division. Information may be obtained on request.

EXPLOSIVES DIVISION

Authorized Fireworks—concluded

Foreign Manufacturers (Certain Fireworks Authorized*)—concluded

Oswald Bradley Ltd., Southport, Lancs., England
Brookside Pyrotechnic & Chemical Co., Elkton, Md., U.S.A.
Bryant & May Ltd., London, England
Contimetall Industry (Hemel Hempstead) Ltd., Hemel Hempstead, Herts., England
EM-GE Sportgerate K-G Gerstenberger Co., Wurttemberg, Germany
Exportvertrieb Pyrotechnik, Hamburg, Germany
Thos. Hammond & Company, Craigmillar, Edinburgh, Scotland
Haley & Weller Ltd., London, England
Harvell-Kilgore Corporation, Boliver, Tenn., U.S.A.
Hitt Fireworks Company Limited, Seattle, Wash., U.S.A.
Hudson Fireworks Display Company, Hudson, Ohio, U.S.A.
Illinois Fireworks Co., Danville, Ill., U.S.A.
Interstate Fireworks Manufacturing and Display Company, Bridgewater, Mass., U.S.A.
Japan Fireworks Trading Company Ltd., Tokyo, Japan
Jatina Manufacturing Co. Inc., Mount Vernon, N.Y., U.S.A.
Keystone Fireworks Manufacturing Co. Inc., Dunbar, Pa., U.S.A.
Lakeside Railway Fusee Company, South Beloit, Ill., U.S.A.
Lenover Corporation, Chester, Pa., and Lenover, Pa., (J. Halpern, Pittsburgh, Pa., Distributors), U.S.A.
Marutamaya Ogatsu Fireworks Co., Tokyo, Japan
National Fireworks Incorporated, West Hanover, Mass., U.S.A.
New Jersey Fireworks Mfg. Co. Inc., Elkton, Md., U.S.A.
S. V. Olsen, Valby Tingsted, 10 Kobenhavn VBY, Denmark
Olin Mathieson Chemical Corporation, New Haven, Conn., U.S.A.
N. V. Pyro, Klazienaveen, Holland
Penguin Associates Inc., Devon, Pa., U.S.A.
Pyro-Chemie (Hermann Weber & Co.) Eitorf/Sieg, West Germany
Pyrotechnischen Fabriken, Wuppertal-Ronsdorf, Germany
Pyrowerk, Hamburg-Neugraben, Germany
Reliance Snap Company, Bishop's Stortford, Herts., England
Richard Appel's Jo King, New York, N.Y., U.S.A.
Schermyl Pistol Rocket Apparatus Ltd., Newdigate, Surrey, England
Schiebeler & Co., Hamburg, Germany
Shioji and Co. Ltd., Osaka, Japan
Societe Pyragric, Rillieux (Ain) Banlieue de Lyon, France
Standard Fireworks Limited, Huddersfield, England
Standard Railway Fusee Corporation, Boonton, N.J. U.S.A.
Stehling and Co., Hamburg, Germany
The J. & E. Stevens Sales Co., New York, N.Y., U.S.A.
Superior Signal Co. Incorporated, South River, N.J., U.S.A.
United Fireworks Manufacturing Company, Dayton, Ohio, U.S.A.
U.S. Fish and Wildlife Service, Pocatello, Idaho, U.S.A.
Van Karner Chemical Arms Corporation, New York, N.Y., U.S.A.
Messrs. Waeco Ltd., High Post, Salisbury, England
Joseph Wells & Sons Limited, Dartford, Kent, England
Joh. Chr. Wendt, Hamburg, Gr. Borstal, Germany
Wischö-K.G. Wilsker Co., Erlangen, West Germany
Wunderkerzen-Werk Carl Flemming, Hamburg-Neugraben, Germany

Chinese firecrackers with gunpowder composition, and not exceeding 2 inches in length and $\frac{1}{4}$ inch in diameter, and small Chinese fireworks, are authorized when found to function satisfactorily on examination at port of entry.

